Non-Attainment Area New Source Review

Preliminary Determination

May 2017

Facility Name: Delta Air Lines Inc. - Technical Operations Center
City: Atlanta
County: Fulton and Clayton
AIRS Number: 04-13-063-00105
Application Number: 44147
Date Application Received: February 21, 2017

Review Conducted by:
State of Georgia - Department of Natural Resources
Environmental Protection Division - Air Protection Branch
Stationary Source Permitting Program

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SUMMARY

The Environmental Protection Division (EPD) has reviewed the application submitted by Delta Air Lines Inc. - Technical Operations Center for a permit to construct and operate Engine Test Cell No. 5 (Emission Unit 5898) and its supporting equipment. The application also requests construction and operation of supporting equipment which includes two 25,000-gallon jet-A fuel storage tanks (SHEA ID Nos. 5894 and 5895), a fuel pump package designed to provide fuel to the jet engines during testing, two 200-gallon oil storage tanks (SHEA ID No. 5938 and SHEA ID No. 5936), one 2,000-gallon used oil storage tank (SHEA ID No. 5893), one 200-gallon diesel storage tank and fuel pump station (SHEA ID No. 5890) to provide fuel to the vehicles used to transport jet engines in and around the Test Cell No. 5 building. A 40-gallon pneumatic pressure pot with spray gun (SHEA ID No. 5901) will also be used to perform engine flush cleaning operations for Test Cell No. 5.

A public advisory was issued for the application on February 22, 2017 and expired on March 24, 2017. No comments were received by the Division during the public advisory period.

Delta Air Lines Inc. - Technical Operations Center is located in Clayton and Fulton Counties, which are classified as “attainment” or “unclassifiable” for SO_2, PM_{10}, $PM_{2.5}$, and CO. Although Clayton and Fulton Counties are attainment for $PM_{2.5}$, Georgia rules for nonattainment permit review are still in effect. Clayton and Fulton Counties are classified as “non-attainment” for ozone (NOX and VOC). Georgia implements the federal nonattainment permitting regulations of 40 CFR 51.165 as Georgia Rules Chapter 391-3-1-.03(8)(c).

The modification of Delta Air Lines Inc. - Technical Operations Center due to this project will result in an emissions increase in VOC, NOx, $PM_{2.5}$, PM_{10}, SO_2, CO and HAP. A Prevention of Significant Deterioration (PSD) analysis for SO2, PM_{10}, $PM_{2.5}$, and CO and a Non-Attainment Area New Source Review (NAA-NSR) analysis for VOC and NOx was performed for the facility to determine if any increase was above the “significance” level. The potential NOx emissions are above the NAA-NSR significant level threshold of 25 tons per year which requires Delta to perform NAA-NSR review. In addition, Delta is also required to demonstrate compliance with NOx RACT.

It is the preliminary determination of the EPD that the proposal provides for the application of Lowest Achievable Emission Rate (LAER) for the control of NOx, as required by NAA-NSR regulation 391-3-1-.03(8)(c)13 for sources with potential emissions of greater than 100 tons per year of NOx.

It has been determined through approved modeling techniques that the estimated emissions will not cause or contribute to a violation of any ambient air standard or allowable PSD increment in the area surrounding the facility or in Class I areas located within 300 km of the facility. It has further been determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Any air quality impacts produced by project-related growth should be inconsequential. The Federal Land Manager (FLM) for any Class I area within 300 km of the proposed project at Delta Air Lines Inc. - Technical Operations Center has been notified and given the opportunity to review the application. The nearest Class I areas within 300 km of the proposed project at Delta Air Lines Inc. - Technical Operations Center is the Cohutta Wilderness Area which is 134 km from the site.

In order to satisfy the offsetting emission reduction credit requirement of 391-3-1-.03(8)(c)13, 40 CFR 51.165, Delta Air Lines Inc. - Technical Operations Center will obtain and retire VOC emission reduction credits for 52 tons of NOx emissions.

This Preliminary Determination concludes that an Air Quality Permit should be issued to Delta Air Lines Inc. - Technical Operations Center for the modifications necessary to construct and operate Engine Test Cell No. 5 (Emission Unit 5898) and its supporting equipment. Various conditions have been incorporated into the current Title V operating permit to ensure and confirm compliance with all applicable state and federal air quality regulations. A copy of the draft permit amendment is included in Appendix A. This Preliminary Determination also acts as a narrative for the Title V Permit Amendment.

1.0 INTRODUCTION – FACILITY INFORMATION AND EMISSIONS DATA

On February 21, 2017, Delta Air Lines Inc. - Technical Operations Center (hereafter Delta) submitted an application for an air quality permit to construct and operate Engine Test Cell No. 5 (Emission Unit 5898) and its supporting equipment. The facility is located at 1775 Aviation Boulevard in Atlanta, Clayton and Fulton Counties.

Table 1-1: Title V Major Source Status

Pollutant	Is the Pollutant Emitted?	If emitted, what is the facility's Title V status for the Pollutant?		
		Major Source Status	Major Source Requesting SM Status	Non-Major Source Status
PM	Yes			✓
PM_{10}	Yes			✓
$PM_{2.5}$	Yes			✓
SO_2	Yes	✓		
VOC	Yes	✓		
NOx	Yes	✓		
CO	Yes	✓		
TRS	N/A			
H_2S	N/A			
Individual HAP	Yes	✓		
Total HAPs	Yes	✓		
Total GHGs	Yes			✓

Table 1-2 below lists all current Title V permits, all amendments, 502(b)(10) changes, and off-permit changes, issued to the facility, based on a review of the "Permit" file(s) on the facility found in the Air Branch office.

Table 1-2: List of Current Permits, Amendments, and Off-Permit Changes

Permit No. 4512-063-0105-V-03-0	April 29, 2015	TV Renewal
Off Permit Change	March 3, 2014	Addition of Aerospace Flush Cleaner SHEA 9416
Off Permit Change	June 9, 2014	Install new anodizing tank (SHEA ID No. 9454)
	June 13, 2014	New process tanks (SHEA ID Nos. 9448 and 9449)
Off Permit Change	July 11, 2014	Addition of Aqueous Flush Cleaner SHE 9472
Off Permit Change	September 17, 2014	Replacement Chromium Plating Tank (SHEA 9522) and Control Device (SHEA 9523)
Off Permit Change	July 11, 2014	Addition of Ultrasonic Flush Cleaner and Rinsing Tank SHEA 9473
Off Permit Change	November 12, 2014	Replacement Sulfuric Acid / Hydrofluoric Acid Tank SHEA 9543
Off Permit Change	November 24, 2014	Enlargement of Paint Booth SHEA 1328
Off Permit Change	November 24, 2014	Addition of Alcohol Dip Tank SHEA 9548
Off Permit Change	December 22, 2014	Addition of Aqueous Flush Cleaning Tank SHEA 9605
Off Permit Change	January 23, 2015	Reversal of the approved off permit change

Off Permit Change	February 2, 2015	Replacement Chromic Acid Bright Dip Tank SHEA 9622, replacement Nitric Acid Plasma Strip Tank SHEA 9623 and addition of Nickel Strip Tank SHEA 9624
Off Permit Change	March 9, 2015	SHEA 0939 to move from Insignificant to Group FC01, SHEA 0940 to move from FC01 to insignificant.
Off Permit Change	April 30, 2015	Replacement Spray Booth Flush Cleaner SHEA 9659
Off Permit Change	August 17, 2015	Change in Coating Material from Non-VOC in Aerospace Surface Coating Booth SHEA 0410
Amendment No. 4512-063-0105-V-03-1	December 30, 2015	Permitting past Off permit changes and clearing the cumulative modification.
Off Permit Change	January 13, 2016	Installation of Acetone spray gun cleaner (SHEA 9829)
Off Permit Change	May 3, 2016	Replacement of Ultrasonic cleaning tanks (6532 and 6943) and replacement of Chrome Tank (0840)
Off Permit Change	May 17, 2016	Installation of a ultrasonic Cleaning Tank (9926) and replacement of a parts washer (4515) with (9938)
Off Permit Change	August 2, 2016	Replacement of Process Tanks (SHEA ID 0527 & 7208) with two identical tanks
Off Permit Change	August 2, 2016	Installation of direct fired comfort heaters (SHEA ID 5234 & 5235).
Off Permit Change	September 21, 2016	Replacement of the burner with ultra-low NOx burner
Off Permit Change	September 21, 2016	Replacement of parts washer SHEA 2122 with (SHEA 5440) and addition of a parts washer (SHEA 5472)
Off Permit Change	January 9, 2017	Replace existing chrome tanks (SHEA ID 9522 and 0841)
Off Permit Change	January 11, 2017	Addition of a Flouride Ion Cleaning and Vapor Phase Aluminizing system
Off Permit Change	March 1, 2017	Permit two existing flush cleaning tanks (SHEA 0077 and SHEA 0078)
Off Permit Change	March 1, 2017	Documentation of flush cleaning units, SHEA 5902 & 5907

The detailed emissions calculations for Table 1-3 can be found in detail in the facility's NAA-NSR application (see Section 2 and Appendix C of Application No. 44147). These calculations have been reviewed and approved by the Division. Based on the proposed project description and data provided in the permit application, the estimated incremental increases of regulated pollutants from the facility are summarized in Table 1-3 below:

Table 1-3: Emissions Increases from the Project

Pollutant	Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review	NAA-NSR Significant Emission Rate	Subject to NAA-NSR Review
PM	1.6	25	No	--	--
PM_{10}	1.6	15	No	--	--
VOC	3.1	40	No	--	--
NOX	39.5	40	NAA NSR	25	**Yes**
CO	16	100	No	--	--
SO_2	9.7	40	No	--	--
TRS	0	10	No	--	--
Pb	0	0.6	No	--	--
Fluorides	0	3	No	--	--
H_2S	0	10	No	--	--
SAM	0	7	No	--	--

Delta is located in the Atlanta Ozone Nonattainment Area and is an existing major stationary source under Nonattainment Area New Source Review (NAA-NSR) for VOCs and NOX. NAA-NSR applies to new major sources or major modifications at existing major stationary sources for pollutants where the area the source is located in is classified as non-attainment with respect to the National Ambient Air Quality Standards (NAAQS). Per Georgia Rule 391-3-1-.03(8)(c)(13), a major NAA-NSR source is allowed to increase emissions by the de minimis threshold of 25 tons aggregated over any period of five consecutive calendar years, including the calendar year in which such increase occurred, without triggering NAA-NSR review.

The potential NOX and VOC emissions from the Test Cell No. 5 project along with other contemporaneous changes for the site are compared against the relevant NAA-NSR major modification thresholds in Table 1-4 below.

Table 1-4: NAA-NSR Applicability Assessment

Year	Annual Emissions Increase Totals (tpy)		5-year Emissions Increase Totals (tpy)	
	VOC	NOx	VOC	NOx
2013	0.71	1.58	5.91	5.02
2014	2.69	4.7	8.27	9.09
2015	0.65	4.79	4.86	13.84
2016	0.85	6.65	5.14	20.00
2017	0.15	0.12	5.05	17.84
2018	--	--	4.34	16.26
2019	3.05	39.5*	4.70	51.06*
NAA-NSR Major Modification Threshold (tpy)			25	25
NAA-NSR Major Modification?			No	Yes

* NOx emissions from this project will not be included in future assessments

Based on the information presented in Table 1-3 and Table 1-4 above, Delta's proposed modification, as specified per Georgia Air Quality Application No. 44147, is classified as a major modification under NAA-NSR because the potential emissions of NOx are greater than 25 tons per year. Because this project will have a Nonattainment Area New Source Review for the NOx emissions from this project, the NOx emissions from this project will not be included in future NAA-NSR applicability assessments which concerns cumulative project emissions over five year periods.

Through its new source review procedure, EPD has evaluated Delta's proposal for compliance with State and Federal requirements. The findings of EPD have been assembled in this Preliminary Determination.

2.0 PROCESS DESCRIPTION

Delta Air Lines, Inc. Technical Operations Center performs aircraft maintenance and repair operations. Specific activities conducted at the facility include, but are not limited to, surface coating, solvent cleaning, electroplating, depainting, engine testing, and facilities support activities including boilers, emergency power generators, and fire pumps.

According to Application No. 44147, Delta has proposed to construct and operate an additional test cell which will be Test Cell No. 5 (SHEA ID No. 5898) in addition to supporting equipment. Test Cell No. 5 will accommodate future aircraft engines for which the current test cells do not have the capability to house. The supporting equipment for Test Cell No. 5 will include two, 25,000-gallon jet-A fuel storage tanks (SHEA ID Nos. 5894 and 5895) and a fuel pump package designed to provide fuel to the jet engines during testing. The two jet-A fuel storage tanks associated with Test Cell No. 5 will be filled via a fuel line connected to the existing system which fills the storage tanks for the current jet engine test cells. Jet-A fuel will be transferred from the two jet-A storage tanks to Test Cell No. 5 via the fuel pump package. There will be two, 200-gallon oil storage tanks installed as part of the project, one for lubrication (SHEA ID No. 5938) and one for preservation oil (SHEA ID No. 5936) which will provide oil to the jet engines being tested within Test Cell No. 5. In addition, Delta is proposing the installation of one 2,000-gallon used oil storage tank (SHEA ID No. 5893) that will collect used lubrication oil from the jet engines through a line connecting to the pre-test bay of the Test Cell No. 5 building. Delta also plans to install one 200-gallon diesel storage tank and fuel pump station (SHEA ID No. 5890) to provide fuel to the vehicles used to transport jet engines in and around the Test Cell No. 5 building. A 40-gallon pneumatic pressure pot with spray gun (SHEA ID No. 5901) will also be used to perform engine flush cleaning operations for Test Cell No. 5. Other general fugitive material usage operations may also be conducted.

Jet engine test cells are structures designed to hold and operate aircraft engines for the purpose of performing sophisticated monitoring of engine performance under variable pre-flight and flight conditions. The principal components of jet engine test cells are: 1) a building that encloses the engine and instrumentation and provides fuel and structural support during testing; 2) an augmentation tube; and 3) a blast room and exhaust. During the testing, the engine is operated at various power levels to simulate flight conditions and to test the engine over the full test cycle.

The Delta permit application and supporting documentation are included in Appendix A of this Preliminary Determination and can be found online at http://epd.georgia.gov/air/psd112gnaa-nsrpcp-permits-database.

3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

State Rules

Georgia Rule for Air Quality Control (Georgia Rule) 391-3-1-.03(1) requires that any person prior to beginning the construction or modification of any facility which may result in an increase in air pollution shall obtain a permit for the construction or modification of such facility from the Director upon a determination by the Director that the facility can reasonably be expected to comply with all the provisions of the Act and the rules and regulations promulgated thereunder. Georgia Rule 391-3-1-.03(8)(c) continues that no permit to construct a new or modified major stationary source to be located in any area of the State determine and designated by the U.S. EPA Administrator or the Director as not attaining a National Ambient Air Quality Standard or in areas contributing to the ambient air levels of such pollutants in such areas of non-attainment shall be issued unless such proposed source meets all the requirements for review and for obtaining a permit prescribed in 391-3-1-.03(8)(c)13 [nonattainment new source review] and 391-3-1-.02(7) [PSD permits] if applicable.

Delta is located in Clayton and Fulton Counties, which are designated non-attainment for ozone (VOC and NOx).

Georgia Rule 391-3-1-.02(2)(b) "Visible Emissions"
Georgia Rule (b) is applicable and it limits visible emissions from the facility to less than forty (40) percent opacity. The current Test Cells at the facility are subject to this opacity limit. This rule is already located in Permit No. 4512-063-0105-V-03-0 as Condition 3.4.1. No opacity is expected from Test Cell No. 5.

Georgia Rule 391-3-1-.02(2)(d) "Fuel-Burning Equipment"
Georgia Rule (d) limits particulate and visible emissions from fuel-burning equipment. Fuel-burning equipment is defined as, "equipment the primary purpose of which is the production of thermal energy from the combustion of any fuel". Because Test Cell No. 5 does not meet this definition, Georgia Rule (d) does not apply.

Georgia Rule 391-3-1-.02(2)(g) "Sulfur Dioxide"
Georgia Rule (g) limits the fuel combusted in fuel burning sources to a fuel sulfur content of no more than 2.5% by weight. The Test Cell only combusts jet fuel, which is inherently compliant as it is a low sulfur content fuel. This rule is already located in Permit No. 4512-063-0105-V-03-0 as Condition 3.4.4.

Georgia Rule (n) "Fugitive Dust"
Georgia Rule (n) limits fugitive dust. Delta will be required to take all reasonable precautions to prevent fugitive dust from becoming airborne and to maintain visible emissions from fugitive dust below 20% opacity.

Georgia Rule 391-3-1-.02(2)(yy) "Emissions of Nitrogen Oxides from Major Sources"
Georgia Rule (yy) is applicable to emission sources located in the counties of Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale which have potential NOx emissions exceeding 25 tpy. Georgia Rule (yy) requires a case-by-case analysis of NOx Reasonably Available Control Technology (RACT) for all

emission sources not specifically regulated by a more specific NOx rule. Test Cell No. 5 (SHEA ID No. 5898) is located in Clayton and Fulton Counties, is not subject to a specific NOx rule, and is located at a site that has potential NOx emissions greater than 25 tpy; therefore, Test Cell No. 5. is subject to Georgia Rule (yy) and needs to perform a case-by-case NOx RACT. The NOx RACT analysis is provided in Section 4 - Control Technology Review of the application along with the LAER analysis.

Georgia Rule 391-3-1-.02(2)(tt) "VOC Emissions from Major Sources"
Georgia Rule 391-3-1-.02(2)(tt) applies to emission sources located in the counties of Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale which have potential VOC emissions exceeding 25 tpy and requires a case-by-case analysis of VOC Reasonably Achievable Control Technology (RACT) for all emission sources not subject to any other more specific VOC requirements contained in other subsections of the Georgia Rule. Because Georgia Rule (kkk) applies to the flush cleaning operations (SHEA ID No. 5901) associated with Test Cell No. 5, Rule (tt) would not apply to this source. Because the facility is located in Clayton and Fulton Counties, has potential VOC emissions greater than 25 ton/yr, and there are no specific VOC rules applicable to Test Cell No. 5 (SHEA ID No. 5898), the two 25,000-gallon jet-A fuel storage tanks (SHEA ID Nos. 5894 and 5895), 2,000-gallon used oil storage tank (SHEA ID No. 5893), 200-gallon diesel storage tank and fuel pump (SHEA ID No. 5890), 200-gallon lubrication oil storage tank (SHEA ID No. 5938), or the 200-gallon preservation oil storage tank (SHEA ID No. 5936), these emission sources will be subject to Rule (tt).

Test Cell No. 5 has potential VOC emissions of 1.6 tpy. The aircraft engines that will be tested emit VOC due to incomplete combustion. These engines are designed for fuel efficiency (i.e., high combustion efficiency); therefore, VOC emissions are inherently minimized. Additionally, there are currently no add-on controls in use for jet engine test cells. Therefore, RACT for Test Cell No. 5 is deemed to be "no control". The Division has reviewed the summary of VOC RACT and agrees with the facility that there are no technically feasible control options.

The 2,000 gal Used Oil Storage Tank (SHEA ID No. 5893), 200 gal Diesel Storage Tank and Fuel Pump Station (SHEA ID No. 5890), 200 gal Lubrication Oil Storage Tank (SHEA ID No. 5938), or the 200 gal Preservation Oil Storage Tank (SHEA ID No. 5936), 25,000 gal Jet A Fuel Storage Tank (SHEA ID No. 5894), and 25,000 gal Jet A Fuel Storage Tank (SHEA ID No. 5895) have negligible VOC emissions and are exempt from Rule (vv). Therefore, these sources can be dismissed from VOC RACT consideration.

Georgia Rule 391-3-1-.02(2)(vv) "Volatile Organic Liquid Handling and Storage"
Georgia Rule (vv) requires the transfer of volatile organic liquid from any delivery vessel into a stationary storage tank of greater than 4,000 gallons to be equipped with submerged fill pipes. This regulation applies to specific counties identified in the rule, including Clayton and Fulton Counties. Although the two 25,000 gallon jet fuel storage tanks (SHEA ID Nos. 5894 and 5895) have capacities greater than 4,000 gallons, these tanks are not subject to Georgia Rule (vv) since there is no transfer of volatile organic liquid from any delivery vessel to these tanks. The two jet-fuel storage tanks will be filled via a fuel line connected to the existing system that fills the storage tanks for the current jet engine test cells. The 200 gallon diesel fuel (SHEA ID No. 5890), 2,000 gallon used oil storage tanks (SHEA ID No. 5893), 200-gallon lubrication oil

storage tank (SHEA ID No. 5938), and the 200-gallon preservation oil storage tank (SHEA ID No. 5936) are also not subject to the requirements of this rule as the capacities of these tanks are less than 4,000 gallons.

Georgia Rule 391-3-1-.02(2)(kkk) "VOC Emissions from Aerospace Manufacturing and Rework Facilities"

Georgia Rule (kkk) limits VOC emissions from coating and cleaning operations conducted at aerospace manufacturing and rework facilities. This regulation applies to the Test Cell No. 5 flush cleaning operations (SHEA ID No. 5901) due to the usage of a cleaning solvent. The engine cleaning operation is considered a flush cleaning operation based on the definition contained in the rule. As a flush cleaning operation which uses an aqueous cleaning solvent, the Test Cell No. 5 engine cleaning operation would be subject to recordkeeping requirements to maintain a current list of flush cleaning solvents with documentation that demonstrates that the cleaning solvent complies with the composition requirement for an aqueous cleaning solvent as defined in this regulation. As part of the requirement, Delta is also required to record the annual amount of each applicable solvent used. Some of the general fugitive material usage operations may also be regulated under Rule (kkk). Delta will continue to comply with Rule (kkk) as detailed in Conditions 3.3.18 through 3.3.2 and 3.4.7 through 3.4.11 located in Permit No. 4512-063-0105-V-03-0.

Georgia Rule 391-3-1-.03(8)(c)

This Georgia Rule contains the adopted elements of the Federal New Source Review provisions which the United States Environmental Protection Agency (EPA) has approved as part of Georgia's State Implementation Plan (SIP). This means that Georgia EPD issues NAA-NSR permits for new major sources pursuant to the requirements of Georgia's regulations.

This section of the Georgia Rules for Air Quality Control applies to newly constructed or modified existing sources, located in a Non-Attainment Area, whose potential emissions of any regulated pollutant exceed the major source threshold (in this case, 25 tons per year of NOx). This section also applies to existing sources making a modification whose potential emissions exceed the major modification emission thresholds listed in 40 CFR 52.24(f)10.

Sources being permitted under these provisions are required to:

a. Obtain and retire offsetting emission reduction credits prior to startup

Under the provisions of 40 CFR 51.165, offsetting emission reduction credits must be procured by the source prior to commencing operation in lieu of performing an ambient air quality analysis (only applicable for emissions of VOC or NOx). The purpose of the emission offset credits is to ensure that the sum total of the emissions of the non-attainment pollutant, including the emissions from the proposed facility, are less than the sum total of the non-attainment pollutant emissions before the proposed facility begins operation, so as to represent (when considered together with other air pollution control measures legally enforced in such areas or regions) reasonable further progress toward attaining the National Ambient Air Quality Standard for which the area is in non-attainment.

The US EPA has established ratios relating the amount of emission offset credits that must be obtained to the amount of allowable non-attainment pollutant emissions from a major source or modification for the five non-attainment area classifications. The classifications and ratios correspond as follows: marginal (1.1:1), moderate (1.15:1), serious (1.2:1), severe (1.3:1), and extreme (1.5:1). Metro Atlanta is currently "moderate" under the 2008 ozone standard, but Georgia's NAA-NSR rules still reflect when the 13-county Atlanta 1-hour Ozone Non-Attainment Area was designated as "severe", meaning for every 1 ton of allowable emissions from a proposed major source, 1.3 tons of emission offset credits must be procured.

Delta has requested a 39.5 ton per year NOx emission limit for Test Cell No. 5. With a 1.3:1 offset ratio, a total of 52 tons per year of NOx offset credits need to be obtained. Delta has stated its intention to procure 52 tons of NOx emission reduction credits prior to operation of the facility.

b. Comply with the lowest achievable emission rate (LAER)

The project emissions exceed the NAA-NSR major source threshold for NOx of 25 tons per five calendar-year period. Because the facility-wide potential emissions of NOx exceed 100 tpy, the proposed project is subject to Lowest Achievable Emission Rate (LAER) requirements as stated in 391-3-1-.03(8)(c)13(iii).

c. Certify that all other major stationary sources owned or operated by the Permittee are operating in compliance, or are on a schedule of compliance

Delta owns three major stationary sources in the State of Georgia: Technical Operations Center (AIRS No. 04-13-063-00105), General Office Facilities (AIRS No. 04-13-121-00807) and Atlanta Station (AIRS No. 04-13-063-00059). All of these Delta facilities are in compliance, or on a schedule for compliance, with all applicable federal and state emission limitations and standards. The most recent Title V compliance reports for these facilities were relied upon for this determination.

d. Submit an analysis of alternative sites, sizes, production processes and environmental control techniques for the proposed source to determine whether the benefits of the proposed source significantly outweigh the environmental and social costs imposed as the result of its proposed location, construction, or modification

Delta Air Lines Inc. - Technical Operations Center is located at the Airport which allows Delta to conduct efficient maintenance and testing of the jet engines in the aircraft fleet. Periodic testing of jet engines is required in order to meet FAA regulatory requirements as well as manufacturer specified maintenance to ensure safe and efficient operation. This requires that jet engines from the aircraft fleet be periodically brought offline to undergo testing and maintenance within a test cell. Based on the projection of newer, next generation jet engines being incorporated into Delta's aircraft fleet in the upcoming years, the required testing and maintenance would be performed within Test Cell No. 5 as the existing test cells could not accommodate these types of engines. In order to minimize the period of downtime for the testing and efficiently conduct required maintenance on the engines, the close proximity of Test Cell No. 5 to the Airport is a crucial aspect of the project. Additionally, locating Test Cell No. 5 outside of the Airport (and outside of the Atlanta Ozone Nonattainment Area) would not be feasible as aircraft engines would have to be transported offsite via truck trailers from the Airport for testing. The extended transportation distance of jet engines would increase the impact of emissions from the transport equipment, cause increased likelihood of damage to the jet engines, and add safety issues related to the transport of large equipment via large trucks on the roads in and out of the Airport. As such, an alternative site is not feasible for Test Cell No. 5.

The proposed Test Cell No. 5 utilizes new, state-of-the-art technology to conduct engine testing and analysis on next generation aircraft fleet. Jet engine testing is a tightly controlled process that requires dedicated structures with specialized test equipment and instrumentation in order to comply with FAA regulations and engine manufacturer maintenance requirements. The design of Test Cell No. 5 will result in a state-of-the-art facility designed to maximize testing efficiency while minimizing the acoustical impact on the surrounding environments. As such, alternative process equipment, and to a great extent process material alternatives, are not available.

SIP Permit Exemptions

Georgia Rule 391-3-1-.03(6) allows activities which are exempt from SIP permit requirements unless otherwise required by EPD. The storage tanks associated with Test Cell No. 5 are exempt from SIP permit requirements. All petroleum liquid storage tanks storing a liquid with a true vapor pressure of equal to or less than 0.50 psia as stored are exempted per Georgia Rule 391-3-1-.03(6)(c)(1). The two 25,000-gallon jet-A fuel storage tanks (SHEA ID Nos. 5894 and 5895) each store a petroleum liquid with a true vapor pressure equal to or less than 0.50 psia, these emissions sources will be exempted. The 2,000-gallon used oil storage tank (SHEA ID No. 5893), 200-gallon diesel storage tank (SHEA ID No. 5890), 200-gallon lubrication oil storage tank (SHEA ID No. 5938), and 200-gallon preservation oil storage tank (SHEA ID No. 5936) are exempt from SIP permit requirements under Georgia Rule 391-3-1-.03(6)(c)(3) which exempts all petroleum liquid storage tanks with a capacity of less than 10,000 gallons storing a petroleum liquid. The diesel fuel pump station associated with the 200-gallon diesel storage tank (SHEA ID No.5890) is exempt from SIP permit requirements under Georgia Rule 391-3-1-.03(6)(i)(3) which exempts cumulative modifications not covered in an existing permit to an existing permitted facility where the combined VOC emission increases from all nonexempt modified activities are below 2.5 tpy for facilities located in Fulton and Clayton counties. Applicable emission limitations and/or standards under Georgia Rule 391-3-1-.02 will still apply.

Federal Rules

New Source Performance Standards (NSPS)

40 CFR 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

Subpart Kb applies to storage vessels with capacities equal to or greater than 75 cubic meters (approximately 19,800 U.S. gallons) that are used to store volatile organic liquids with true vapor pressure higher than 15.0 kilopascals (kPa). This standard does not apply to the 2,000-gallon used oil storage tank (SHEA ID No. 5893), 200-gallon diesel storage tank (SHEA ID No. 5890), 200-gallon lubrication oil storage tank (SHEA ID No. 5938), or the 200-gallon preservation oil storage tank (SHEA ID No. 5936), since these storage tanks have storage capacities below 75 cubic meters, or 19,800 gallons. Additionally, although the two proposed 25,000 gallon jet fuel storage tanks (SHEA ID Nos. 5894 and 5895) have capacities greater than 75 cubic meters, these storage tanks store jet-A fuel which has a liquid true vapor pressure less than 15.0 kPa.

Therefore, this regulation does not apply to any of the storage tanks associated with the Test Cell No. 5 project. Delta will maintain documentation of the volume, contents, and true vapor pressure of the two Jet-A storage tanks associated with the Test Cell No. 5 project.

National Emissions Standards For Hazardous Air Pollutants (NESHAP)

40 CFR 63 Subpart GG – National Emission Standards for Aerospace Manufacturing and Rework Facilities

Subpart GG applies to facilities that are engaged, either in part or in whole, in the manufacture or rework of commercial, civil, or military aerospace vehicles or components and are a major source of HAP emissions. Under this NESHAP, flush cleaning is defined as the removal of contaminants such as dirt, grease, oil, and coatings from an aerospace vehicle or component or coating equipment by passing solvent over, into, or through the item being cleaned. The Subpart GG definition further specifies that the solvent may simply be poured into the item being cleaned and then drained, or be assisted by air or hydraulic pressure, or by pumping and that hand-wipe cleaning operations where wiping, scrubbing, mopping, or other hand action are used are not included. Based on this definition, the engine cleaning operation (SHEA ID No. 5901) proposed as part of the Test Cell No. 5 project is considered a flush cleaning operation under Subpart GG. Since flush cleaning operations are listed as an affected source under Subpart GG, this regulation would apply to the engine cleaning operation (SHEA ID No. 5901) for Test Cell No. 5. Some of the general fugitive material usage operations may also be regulated under Subpart GG. Delta will continue to comply with the requirements of this regulation as it applies to applicable operations at Delta. All other emission sources associated with Test Cell No. 5 are not listed as an affected source under Subpart GG; therefore, the requirements of this regulation only apply to the engine cleaning operation (SHEA ID No. 5901). The requirements for this NESHAP are included in Conditions 3.3.15 and 3.3.16 of Permit No. 4512-063-0105-V-03-0.

40 CFR 63 Subpart PPPPP – National Emission Standards for Hazardous Air Pollutants: Engine Test Cells/Stands

Subpart PPPPP was promulgated in May 2003, and applies generally to internal combustion engine test cells/stands that are located at major sources of HAP emissions. As a source category, Test Cell No. 5 would be potentially subject to this NESHAP. However, Test Cell No. 5 is exempt from the requirements of this subpart and the NESHAP General Provisions (Subpart A) per 40 CFR 63.9290(d)(1) which exempts "any portion of a new or reconstructed affected source located at a major source" used exclusively for testing combustion turbine engines.

State and Federal – Startup and Shutdown and Excess Emissions

Excess emission provisions for startup, shutdown, and malfunction are provided in Georgia Rule 391-3-1-.02(2)(a)7. Excess emissions from the Engine Test Cell No. 5 (Emission Unit 5898) associated with the proposed project would most likely results from a malfunction of the associated control equipment. The facility cannot anticipate or predict malfunctions. However, the facility is required to minimize emissions during periods of startup, shutdown, and malfunction.

Federal Rule – 40 CFR 64 – Compliance Assurance Monitoring

Under 40 CFR 64, the *Compliance Assurance Monitoring* Regulations (CAM), facilities are required to prepare and submit monitoring plans for certain emission units with the Title V application. The CAM Plans provide an on-going and reasonable assurance of compliance with emission limits. Under the general applicability criteria, this regulation applies to units that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions levels exceed the major source thresholds under the Title V permitting program. Although other units may potentially be subject to CAM upon renewal of the Title V operating permit, such units are not being modified under the proposed project and need not be considered for CAM applicability at this time.

Therefore, this applicability evaluation only addresses the Engine Test Cell No. 5 (Emission Unit 5898) and its supporting equipment, which does not employ any air pollution control devices; therefore, the CAM requirements are not triggered by the proposed modification.

NAA - NSR – 40 CFR 51.165

The provisions of Statutory Restrictions on New Sources (NSR) in 40 CFR 51.165 are implemented as Georgia Rule 391-3-1-.03(8)(c). For a discussion of these provisions, see the discussion on the previous page regarding Georgia Rule for Air Quality Control 391-3-1-.03(8)(c). Because the proposed Test Cell No. 5 project will be located in the Atlanta Ozone Nonattainment Area and has a net cumulative NOx emissions increase above the NNSR major modification threshold, Delta is required to implement the LAER level of air pollution control to minimize NOX emissions from jet engine Test Cell No. 5 (SHEA ID No. 5898).

Definition of LAER

Under 40 CFR 51.165(a)(1)(xiii) and Georgia Rule 391-3-1-.03(8)(g)(1)(vi), LAER is defined as the more stringent rate of emissions based on the following:

(A) The most stringent emissions limitation which is contained in the implementation plan of any State for such class or category of stationary source, unless the owner or operator of the proposed stationary source demonstrates that such limitations are not achievable; or

(B) The most stringent emissions limitation which is achieved in practice by such class or category of stationary sources. This limitation, when applied to a modification, means the lowest achievable emissions rate for the new or modified emissions units within or stationary source. In no event shall the application of the term permit a proposed new or modified stationary source to emit any pollutant in excess of the amount allowable under an applicable new source standard of performance.

4.0 CONTROL TECHNOLOGY REVIEW OF NOX RACT and LAER

The proposed project will result in emissions that are significant enough to trigger NAA-NSR review for NOx. Due to the NOx emissions from Test Cell No. 5 being limited to less than 40 tpy, the proposed project will avoid a PSD review and will not be subject to BACT. However, the proposed project will be subject to LAER. This section also discusses the NOx RACT review required by Georgia Rule (yy).

Primary emissions from Test Cell No. 5 are NOx emissions from the combustion of jet fuel while testing engines. A small amount of CO, PM, PM_{10}, $PM_{2.5}$, SO_2, VOC and greenhouse gases are also expected during combustion.

Engine Test Cell No. 5 - Background

The Engine Test Cell No. 5 (Emission Unit 5898) is to accommodate future aircraft engines for which the current test cells do not have the capability to house. Jet engine test cells are structures designed to hold and operate aircraft engines for the purpose of performing sophisticated monitoring of engine performance under variable pre-flight and flight conditions. Periodic jet engine testing is required to meet Federal Aviation Administration (FAA) regulatory requirements as well as manufacturer specified maintenance to ensure safe and efficient operation. The principal components of jet engine test cells are: 1) a building that encloses the engine and the instrumentation and provides fuel and structural support during testing; 2) an augmentation tube; and 3) a blast room and exhaust. During the testing, the engine is operated at various power levels to simulate flight conditions and to test the engine over the full test cycle.

NOx RACT REVIEW

Applicant's Proposal

The following potential control technologies were reviewed for NOx RACT:

- Low NOx Engines
- Combustion Controls

Low Nox Engine

Low NOx engines were eliminated from further review because neither the combustor in the engine nor the combustion characteristics of the engine can be altered by Delta without significantly affecting the performance of the aircraft engine itself. However, with the replacement of older model aircraft engines by newer model (Next Gen) engines within the aircraft fleet, potential NOx emissions attributed from engine testing will inherently be reduced as the Next Gen engines are certified to be lower emitting than older model engines.

Combustion Control

Combustion control methods that prevent or reduce NOx formation during the combustion process were not evaluated due to the fact that changing the combustion process during testing will directly and adversely impact the design, safety, operation and performance of the aircraft engine.

The joint report submitted to the U.S. Congress in October 1994 by the EPA and the DOT entitled "Nitrogen Oxide Emissions and Their Control from Uninstalled Aircraft Engines in Enclosed Test Cell," Report No. EPA-453/R-94-068, October 1994, concludes that there are no existing technologies for control of NOx that have been applied (full scale) to aircraft engine test cells in the United States. The differences in engines, engine tests, engine test cell sizes, and engine types complicate the application of NOx control systems to engine test cells.

Based on the controls addressed above, it is concluded that low NOx engines and combustion control is not technically feasible.

Post-Combustion Controls

Potential NOx control technologies for jet engine test cells were obtained from the EPA Report, 453/R-94-068, October 1994, and the Los Alamos National Laboratory presentation, LA-UR-99-3072, titled "NOx Removal in Jet Engine Test Cell Exhaust." These technologies are considered post-combustion control methods. Post-combustion control methods address NOx emissions after formation.

Post-combustion control technologies include:

- Selective Catalytic Reduction (SCR) with Ammonia Injection
- Selective Non-Catalytic Reduction (SNCR)
- Reburn NOx Control Technology
- NOx Sorbent Technology
- Water or Steam Injection
- Non-thermal Plasma Systems

Selective Catalytic Reduction

Through the injection of a nitrogen based reagent such as ammonia (NH3) into the ductwork, downstream of the combustion unit, the SCR control process chemically reduces the NOx molecule into molecular nitrogen and water. The combustion unit exhaust gas mixes with the ammonia and enters a reactor module containing catalyst where the ammonia reacts selectively with the NOX within a specific temperature range and in the presence of the catalyst and oxygen. A high temperature exhaust gas is required to convert the injected ammonia into free radicals which provide the activation energy for the reaction to occur.

The required catalyst temperature is approximately 700°F, though some catalysts can operate near 500°F. Several catalysts, including platinum and titanium oxide, are available. Proper operation depends on many factors including correct stoichiometric ratio of ammonia to NO, reaction temperature, and condition of catalyst, in addition to the "space velocity," which is expressed as exhaust gas volumetric flow rate per unit catalyst volume. The NOx reduction efficiency for SCR with ammonia injection has been demonstrated at 80 to 90 percent.

This technology is available in the United States, and is used with stationary gas turbine applications for power plants. However, there are significant differences between exhaust gas characteristics of power plant stationary gas turbines and those from jet engine test cells. The design of a jet engine test cell requires the exhaust from the mounted jet engine undergoing testing to be directed through the augmentor tube prior to being redirected to a vertical flow through the exhaust stack. The engine exhaust gas passage through the augmentor tube is required in order to attenuate noise, reduce the test cell pressure to a level equivalent to the pressure at the engine compressor inlet, provide engine cooling normally obtained by the motion of the aircraft in flight, and reduce the temperature of the exhaust gas for purposes of protecting the integrity of test cell. As a result of this required cooling of the engine exhaust gas, the test cell stack gas temperatures following the augmentor tube are well below those required by SCR systems. Additionally, the stack gas temperature and the NOx emission rates will vary with engine thrust and the augmentation air as the jet engine runs through the various test modes of a full flight simulation test. The stack gas flow rate and the stack gas temperature vary significantly as the augmentation ratio increases as occurs with turbojet and turbofan engines. At temperatures below the specified SCR operating range, the reaction kinetics decrease and ammonia (EPD air toxic) passes through (ammonia slip). Ammonia slip can cause health effects, visibility of the stack effluent, and the formation of ammonium sulfates. Due to the relatively low stack gas temperatures associated with the operation of test cells, the application of SCR in most cases would require reheating of the exhaust gas to maintain the stack gas temperature within the appropriate catalyst temperature range. Both the duct burner, which would be required to reheat the exhaust gas, and the ammonia injection system must be tightly controlled via the use of feedback control systems to follow the characteristically rapid variations in gas temperature, mass flow rate, and NOX concentration of the test cell exhaust gas. The rapid and frequent changes in engine output would place demands on the SCR controller not found in current (non jet engine test-cell) installations where SCR technology is used; therefore, it is uncertain how effective the required feedback systems would be at tracking such a highly transient emission source. Lag time in the response of the ammonia injection system to changes in exhaust gas conditions would result in increased unreacted ammonia emissions and decreased NOx removal efficiency. Additionally, there would be a potential for greater NOx production associated with heating a very large volume of exhaust gases (approximately 6 million acfm) to raise the temperature to that required by SCR.

Due to the variance in operation and performance of jet engine testing, SCR control was not considered an appropriate technical application and was not considered a technically feasible control option.

Selective Non-Catalytic Reduction

The basis of SNCR technology is a non-catalyzed chemical reaction utilizing an ammonia based reagent (such as urea or ammonia) for reducing NOx into nitrogen (N2) and water (H2O) by injecting this reagent into the post combustion gas stream at temperatures ranging from 1600-2400°F. Within the appropriate temperature range, the gas-phase urea or ammonia decomposes into free radicals including NH_3 and NH_2. After a series of reactions, the ammonia radicals come into contact with the NOx and reduce it to N_2 and H_2O. The conventional SNCR process occurs within the combustion unit, which acts as the reaction chamber when the reagent is injected. This technology has been demonstrated on utility boilers and other fossil-fuel systems to achieve up to 50 percent NOx removal.

The test cell stack gas temperature is 120°F which is significantly below the 1600°F to 2400°F range where SNCR is viable. In addition, a uniform NOx control distribution and an ammonia or urea injection system are required to ensure maximum NOx reduction, and to prevent release of excess NH_3. As with SCR, application of SNCR would require substantial reheating with a gas duct burner to maintain the stack exhaust gas temperature within the appropriate temperature range. The reheat requirements are a function of test cell operating characteristics, which are highly transient and differ depending on the type of engine tested.

Due to SNCR's lower NOX removal efficiency, and the NOX emissions from the duct burner, SNCR may actually cause a net increase in NOX emission from the test cell under most operating conditions. Additionally, implementation of a reagent injection system within the jet engine combustion chamber would not be feasible. Due to the variance in operation and performance of the engine testing, SNCR is not considered a technically feasible control option.

Due to the variance in operation and performance of jet engine testing, NSCR control was not considered an appropriate technical application and was not considered a technically feasible control option.

Reburn NOx

Reburn is a NOX control technology that removes NOX by injecting natural gas in a secondary combustion zone just above the main combustion zone, followed by downstream injection of additional combustion air. The injection of the gas lowers NOx formation in the main combustion zone, where the NOx is reduced by reaction with hydrocarbon fragments formed by the natural gas combustion in fuel-rich conditions.

Exhaust from the jet engine test cell consists of oxygen-rich gas that would require lean reburning, where local fuel-rich conditions occur in an overall fuel-lean exhaust gas. Benchscale studies of reburning in an oxygen-rich gas such as that from a test cell exhaust have been performed. The study showed that lean burn respective removal efficiencies for 1,000 parts per million (ppm) and 500 ppm NOx inlet concentrations were reported at 60 and 30 percent. No studies have been conducted at NOx concentration of 100 ppm that is typical of test cell operation. Until more research and evaluations are performed, the safety and performance issues of this technology cannot be addressed. As a result, reburn NOx control technology was not considered a technically feasible control option.

NOx Sorbent Technology

The exhaust gas passes through a bed of vermiculite impregnated with magnesium oxide (MgO). The NOx is adsorbed on the bed and forms magnesium nitrate. Unlike SCR and SNCR, sorbent technology does not require exhaust gas reheat or ammonia injection. When used with a bed of virgin vermiculite upstream of the one containing magnesium oxide, the removal efficiency of 50 to 70 percent has been reported. This technology has not been demonstrated in practice on a full scale, working test cell. Demonstrated in practice generally means that the control technology has been used in a production situation, and has been demonstrated to be successful at achieving the claimed performance. In such a case, the control option would be technically feasible for consideration in the RACT analysis. Bench scale and pilot plant trials alone are generally not sufficient. Until more research and evaluations are performed, the safety and performance issues of this technology cannot be addressed, and thus this was not considered a technically feasible control option.

Water/Steam Injection

Water/steam injection is an established NOx control technology for stationary gas turbines. The water or steam injected into the primary combustion zone of a gas turbine engine provides a heat sink, which lowers the flame temperature and thereby reduces thermal NOx formation. The use of water/steam injection would require temporary engine modifications and would alter the performance characteristics of the engine being tested. These modifications would result in the evaluation of an aircraft engine within the test cell that would require further modification before being returned to in-flight service. In addition, these modifications would result in engines tested with performance characteristics that are unrealistic or non-representative of the engine operation during in-flight service. Since the engines are tested in a cell to evaluate their performance characteristics, any modifications affecting performance would run counter to the actual reason for testing the engines.

Water/steam injection was not considered a technically feasible control option because any modifications affecting performance of the engines would run counter to the actual reason for testing the engines and the control option generates significant quantities of wastewater contaminated with hydrocarbons, requiring treatment.

Non-Thermal Plasma

NTP systems are a type of advanced oxidation and reduction process making use of “cold combustion” via free-radical reactions. Exhaust gases are contacted with electrical energy to create free radicals, which in turn decompose pollutants such as NOx, SO2, and VOC in the gas phase. The removal efficiency depends on plasma chemistry (free radical yield), reaction chemistry, and applied plasma specific energy. The process is carried out on the exhaust gases without any preheating and has demonstrated removal efficiencies greater than 50 percent in bench-scale and field-pilot demonstration studies. The study describes five candidate NTP systems: pulsed corona, dielectric barrier, hybrid NTP reactor-adsorber, plasma-catalytic hybrid, and corona radical shower. In pulsed corona, dielectric barrier, and corona radical shower systems, ammonia or methane can be added to generate radicals that drive reactions, leading to the formation of particulates that can be removed using an electrostatic precipitator.

Non-Thermal Plasma (NTP) is an emerging technology and has only been demonstrated on a field-pilot scale in one test cell in practice. Until more research and evaluations are performed, the safety, operation and performance issues of this technology cannot be addressed, so this was not considered a technically feasible control option.

Conclusion and NOx Control for RACT

Delta has requested an annual NOx limit of 39.5 tons. The approximate engine test will last about 1000 hours per year with typically two test runs of 8 hours each per week. This interment nature of emissions and extremely large exhaust volume of approximately 6 million acfm makes most technology technically infeasible to implement. Both SCR and SNCR will require reheating of exhaust gas which will require additional fuel and therefore additional NOx generation.

The Division has reviewed NOx RACT performed by Delta and agrees with the facility that there are no technically feasible control options. Since no control technology has been identified as technically feasible, cost effectiveness was not performed for this application. Therefore, RACT for Test Cell No. 5 has been determined to be no control. RACT is considered to be no add-on control for NOx and the RACT emission limits are those based upon design emissions levels.

LAER REVIEW

The analysis for the LAER review also includes the information that was presented for the NOx RACT review since the control technologies reviewed for the NOx RACT review is also applicable for LAER.

Applicant's Proposal for LAER

Delta researched previously permitted projects subject to PSD or NNSR requirements in the following resources:

- The USEPA's RACT, Best Achievable Control Technology (BACT), LAER
- Clearinghouse (RBLC);
- The California Air Resources Board (CARB) BACT Clearinghouse;
- USEPA regional air permitting websites;
- State Implementation Plan (SIP) information found within environmental agency
- websites; and
- Internet research.

Based on a thorough review of the information sources listed above, no determinations were found as a result of the CARB BACT Clearinghouse or SIP searches for jet engine test cells. There were, however, determinations found from the RBLC search, USEPA regional air permitting websites, internet research, and air permit reviews.
An RBLC search was conducted using the following key searches: "test cell," "test stand," "engine test" "engine stand," "jet engine" and "aircraft engine" for the period of January 1990 to January 2017. The results of the RBLC search are presented in Table 4-1 on the following page. The RBLC search resulted in determinations for automotive, marine, and locomotive engines, as well as aircraft engines. The only physical NOx control devices identified from the search are listed for automotive engine test cells. These control determinations would not apply to Test Cell No. 5 as a jet engine test cell is different from an automotive test cell and involves a different type of engine. None of the remaining RBLC determinations identified any add-on control

equipment. There are three determinations which identify the use of good combustion practices for stationary turbine and small engine test cells. These test cells are used to test engines which are much smaller in magnitude than a jet engine and therefore, would not be representative of the Test Cell No. 5 operations. The jet engines tested in Test Cell No. 5 are inherently operated with good combustion practices in order to optimize efficiency. In addition to control equipment determinations, there are NOx emission limits listed for a number of jet engine test cells identified in the RBLC search. However, none of these limits are based on the use of pollution control equipment. The mass-based NOx limits found in the RBLC search are for engine-specific, uncontrolled test cells. Therefore, consideration of these limits as LAER is not appropriate.

Based on the results of the review, there are no identified pollution control devices for control of NOx emissions. There are a few NOx emission limits which were contained in the air permits for a few test cell facilities; however, not all of the equipment or operations for which there are NOx emission rates identified are similar in scope to Test Cell No. 5. For example, Test Cell A-11 located at the General Electric Aviation, Evendale Plant in Ohio is not representative of the operations of Test Cell No. 5 because Test Cell A-11 is permitted to combust a range of fuels other than jet fuel and has a much smaller testing capacity than Test Cell No. 5. The test cells located at the Honeywell - Engines, Inc facility in Arizona conduct testing on auxiliary power units (APUs) which are small gas turbine engines used to provide electricity, compressed air, and/or shaft power for main engine start, air conditioning, electric power and other aircraft systems. While APUs can have similar emissions in scope as jet engines, they ultimately are not similar in magnitude and would not be a good representation of Test Cell No. 5 operation. Additionally, the jet engine test cells located at the Rolls-Royce Corporation facility located in Indiana are designed to test engines with a maximum thrust of 10,000 pounds while the jet engines tested in Test Cell No. 5 have a maximum thrust of 92,000 pounds. Therefore, these test cells are considerably smaller in scope than Test Cell No. 5 and should not be considered as comparable in operations. As discussed above, the application of mass-based NOx limits for these uncontrolled jet test cells is engine-specific. Therefore, consideration of these limits as LAER is not appropriate.

LAER is considered to be no add-on control for NOx. For Test Cell No. 5, Delta is proposing a LAER emission limit for NOx of 39.5 tpy based on design emissions levels. This annual NOx emission limit will be met by calculating the NOx emissions from each engine test based on the engine type, time in operational mode, and the fuel consumption rate. Then, the per-test NOx emissions will be used to calculate the monthly and the 12-month rolling total NOX emissions.

Work practice standards will be included for compliance with LAER. Delta will limit the hours of performance testing for Test Cell No. 5 to 3,000 hours per year. Delta will comply with the work practice standard of the hour limitation by monitoring the monthly hours of engines tested. The fuel used in Test Cell No. 5 will be limited to 0.3 percent sulfur by weight, as defined by the American Society for Testing and Materials in ASTM D1655, "Standard Specification for Aviation Turbine Fuels." Delta will comply with the work practice standard of the sulfur fuel limit by only firing Jet A/Jet A-1 in Test Cell No. 5.

Table 4-1 Summary of RBLC Search Results

RBLC ID No.	Facility Name	Process Description	NOx Limit 1	units	NOx Limit 2	units	NOx Control Determination
TX-0699	Turbine Overhaul Center	Stationary Gas Turbine test cell		--		--	Good Combustion Practices
OH-0355	General Electric Aviation, Evendale Plant	Test Cell 2 – Aircraft Engine	4.4	lb/MMBtu	80	tons/yr	No Control
		Test Cell 1 – Aircraft Engine	1.7	lb/MMBtu	92	tons/yr	No Control
PA-0282	Johnson Matthey Inc/Catalytic	Engine Test Cells (6) – Stationary Internal Combustion	11	tons/yr		--	No Control
MA-0038	General Electric Aviation	Engine Test Cell – Aircraft	67.2	tons/month	157	tons/yr	No Control
OK-0121	Midwest City Air Depot	Jet Engine Test Cells – Aircraft	323.13	tons/yr		--	No Control
VA-0303	Stihl Incorporate	Engine Test Cells – Small Internal Combustion Engines	4.7	tons/yr		--	Good Combustion Practices
IA-0076	John Deere Product Engineering	Test Cell – Small Internal Combustion Engines	1.52	lb/MMBtu	0.86	lb/hr	Good Combustion Practices
MI-0367	GM Powertrain Division	Engine Test Cells /Dynamometers - Automotive Internal Combustion Engines	1.38	lb/MMBtu (gasoline)	2.2	lb/MMBtu (diesel)	No Control
PA-0233	NSWCCD-SSES	Marine Gas Turbine Test Cell – Small Internal Combustion Engines	341	lb/hr		--	No Control
MI-0360	Daimler Chrysler Corporation	Dynamometer Test Cells, Uncontrolled - Automotive Internal Combustion Engines	0.1049	lb/gal of gasoline		--	Thermal oxidizers reduce NOx emissions as well as VOC.
TN-0103	Arnold Engineering Development	Jet Engine Test Cells – Aircraft	1038	tons/yr	1.087	g/b-hp-h	No Control
MI-0306	Schenck Pegasus	Engine Test Cells, Dynamometer – Stationary Internal Combustion	5.76	lb/hr	25.2	tons/yr	No Control
IL-0065	General Motors - Electromotive Division	Test Cells, Durability, Locomotive Engine,(MU1,2,5)		--		--	Engines to be tested must be equipped with turbo- charging & aftercooling, or comparable technology.
PA-0154	General Electric Transportation Systems	Engine , Diesel, Test Cells No. 1 Through 5 - Locomotive	492.2	tons/yr		--	Engine retard, split cooling, electronic fuel injection, depending on engine
MA-0030	GE Aircraft Engines	Jet Engine Test Cell – Aircraft	0.0229	grams/second		--	Minimize use of afterburner mode, restriction on the number of hours an engine may operate.
OH-0299	GE Aircraft Engines Peebles	Jet Engine Test Stand 7 – Aircraft	3113.4	lb/hr	797.2	tons/yr	No Control
OH-0306	GE Aircraft Engines-Peebles Test	Jet Engine Test Stand – Aircraft	3113.4	lb/hr	797.2	tons/yr	Modeling used to meet psd requirements. Designed emission levels used to determine "no control."
TX-0462	Perkinelmer Automotive Researching Inc	Gasoline Engine Testing- Automotive Internal Combustion Engines	3.3	lb/hr	14.3	tons/yr	Limited operations
		Diesel Engine Testing-CAT Stands - Automotive Internal Combustion Engines	12.2	lb/hr	53.8	tons/yr	Limited operations
		Diesel Engine Testing MCD Stands - Automotive Internal Combustion Engines	11.3	lb/hr	49.3	tons/yr	Limited operations

EPD Review – NOx Control for LAER

Georgia Environmental Protect Division (GEPD) has reviewed the emissions and the LAER analysis prepared in the application for the Engine Test Cell No. 5 (Emission Unit 5898). GAEPD agrees with the emission calculations in the application located in Section 2 and Appendix C. GAEPD conducted its own search for NOx controls for a jet engine test cell which had similar results as Delta. GAEPD agrees that NOX control devices for automotive engine test cells would not apply to a jet engine test cell since these are different type of engines. GAEPD also agrees that the NOx emission limits for other facilities found in the RBLC search would not apply for Engine Test Cell No. 5 (Emission Unit 5898) since the other test cells used multiple fuels, were not similar engines or did not have comparable thrusts from the engines tested. GAEPD agrees that LAER should be no add-on control with a NOx emission limit of 39.5 tpy and work practice standards.

Conclusion – NOx Control for LAER

The LAER selection for the Engine Test Cell No. 5 (Emission Unit 5898) will be no add-on control device. Engine Test Cell No. 5 (Emission Unit 5898) will have a NOx emission limit of 39.5 tpy which will be tracked and calculated for monthly emissions and 12-month rolling total emissions.

The work practice standards for Engine Test Cell No. 5 (Emission Unit 5898) will be a 3,000 hours per year for the hours of performance testing and a fuel sulfur content of 0.3 percent sulfur by weight.

5.0 TESTING AND MONITORING REQUIREMENTS

Testing Requirements:

There are no applicable testing requirements being imposed since there are no add-on control devices. Also it is not possible to generate consistent testing conditions for the proposed test cell. There are four different types of engines (Trent XWB, Trent 800, PW4, and CF6) being tested within the test cell. During each engine test, there are four different operating modes (take-off, climb-out, approach, and idle). Additionally, each operating mode varies in length of time; therefore, it is not possible to obtain a consistent period to test the proposed test cell.

Monitoring Requirements:

Delta will use the results of the computer emission monitoring system to calculate monthly and 12-month rolling total NOX emissions from Test Cell No. 5. Delta maintains a computer monitoring system with database tools to estimate and track regulated air pollutant emissions from jet engine testing operations. This system is a computer software-based tool that calculates and records real-time emissions estimates during engine tests based on engine fuel flow rate data and power setting/emission factor correlations. Multiple fuel flow measurements per minute are made by the computer system, and emissions are calculated and reported in real time based on the programmed function of emission factor versus power setting.

As required by NESHAP GG and Georgia Rule (kkk), Delta will maintain a current list of flush cleaning solvents used in Test Cell No. 5 with documentation that demonstrates that the cleaning solvent complies with the composition requirement for an aqueous cleaning solvent as defined by the regulations. Delta will also maintain a record of the annual amount of each applicable solvent used. These rules are existing Conditions 3.3.15 through 3.3.18 and 3.3.22 of Permit No. 4512-063-0105-V-03-0.

Delta will monitor the monthly hours that Engine Test Cell No. 5 is operated and the type of fuel used for Engine Test Cell No. 5 for compliance with work practice standards.

CAM Applicability:

Because there is no control device for Engine Test Cell No. 5 (Emission Unit 5898), CAM is not applicable and is not being triggered by the proposed modification. Therefore, no CAM provisions are being incorporated into the facility's permit.

6.0 AMBIENT AIR QUALITY REVIEW

The applicant is taking a 39.5 tpy NOx limit for PSD avoidance. Therefore, NAAQS demonstration is not required. However, the facility has chosen to demonstrate compliance with visibility impact of Class I areas. The results are provided in Section7.

Georgia Toxic Air Pollutant Modeling Analysis

There are no applicable NAAQS or specific Georgia ambient air standards for the individual toxics emitted by the facility. Georgia EPD regulates the emissions of toxic air pollutant (TAP) emissions through the provisions of the *Georgia Rules for Air Quality Control*, 391-3-1-.02(2)(a)3.(ii). A TAP is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. Procedures governing the Georgia EPD's review of TAP emissions as part of air permit reviews are contained in the agency's "*Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Revised)*."

For projects with quantifiable increases in TAP emissions, an air dispersion modeling analysis is generally performed to demonstrate that off-property impacts are less than the established Acceptable Ambient Concentration (AAC) values. The TAP evaluated is restricted to those that may increase due to the proposed project. Thus, the TAP analysis would generally be an assessment of off-property impacts due to facility-wide emissions of any TAP emitted by a facility. The SCREEN3 or ISCST3 computer dispersion models are commonly used to conservatively predict the maximum 24-hour average or annual ground level concentration (referred to as MGLC) for each pollutant in question. The worst-case HAP and toxic emissions are used to perform the toxic guideline assessment. Each MGLC is compared to its respective acceptable ambient concentration (AAC). The basis for calculation of the AAC comes from the pollutant toxicity rating systems described in the Georgia Air Toxics Guideline.

The primary source of the air toxics of concern considered as part of this project are the emissions from jet fuel combustion from the test cell. All SCREEN runs were conducted using a 1lb/hr modeled emission rate to estimate the maximum predicted ambient impact from each individual stack. Predicted impacts from each SCREEN3 run are then multiplied by the corresponding stack TAP emission rate to estimate the specific pollutant impact from each individual stack. Emission rates for pollutants emitted from the press were divided proportionally based on the proportion of each individual stacks airflow to the total airflow from the press. To ascertain the total predicted impact, the resulting predicted impacts from each individual stack are then summed for comparison to the applicable AAC. This presents a highly conservative estimate of ambient impacts as it presumes the maximum impact from each individual source will occur at the same location.

For each TAP identified for further analysis, both the short-term and long-term AAC were calculated following the procedures given in Georgia EPD's *Guideline*. The AACs were verified by the EPD.

The toxic impact assessment and all detailed information, printouts, and supporting documents can be found in Appendix E of the application. Attachment 1 in Appendix E shows the results for all pollutants evaluated for the toxic impact assessment and demonstrates that modeled pollutants have impacts less than their respective AACs. Table 6-1 summarizes the overall results of the TAP assessment for the pollutants which account for 80% of the total HAPs emissions. The Division has reviewed this impact assessment as well as attached information and has concluded that the emissions from the proposed facility are acceptable, in accordance with the Georgia Toxic Guidelines.

Table 6-1

Pollutant	$MGLC_{1h}$ (ug/m^3)	$MGLC_{15m}$ (ug/m^3)	AAC_{15m} (ug/m^3)	$MGLC_{24h}$ (ug/m^3)	AAC_{24h} (ug/m^3)	$MGLC_a$ (ug/m^3)	AAC_a (ug/m^3)
Ethylene	0.444	None	None	0.178	546	None	None
Formaldehyde	0.354	0.467	246	None	None	0.0283	0.8
Propylene	0.13	None	None	0.0521	2,050	None	None
Acetaldehyde	0.123	0.162	4,500	None	None	0.00982	5
Acetylene	0.113	0.149	266,000	None	None	None	None
Acrolein	0.0705	0.0929	23	None	None	0.00563	0.02
Glyoxal	0.0522	None	None	0.0209	0.238	None	None
Methanol	0.0519	0.064	32,800	None	None	0.00415	20,000
Isobutene/1-Butene	0.0504	None	None	0.0202	1,370	None	None
1,3-Butadiene	0.0485	0.064	1,110	None	None	0.00388	0.03
Benzene	0.0483	0.0638	1,600	None	None	0.00386	0.13
Methylglyoxal	0.0432	None	None	None	None	None	None
CrotoNoneldehyde	0.0297	0.0392	86	0.0119	14.3	None	None
1-Pentene	0.0223	None	None	None	None	None	None
1-Hexene	0.0212	None	None	None	None	None	None
PropioNoneldehyde	0.0209	None	None	0.008	113	0.00167	8
Phenol	0.0209	0.0275	6,000	0.008	45.2	None	None

7.0 ADDITIONAL IMPACT ANALYSES

NAA-NSR requires an analysis of impairment to visibility, soils, and vegetation that will occur as a result of a modification to the facility and an analysis of the air quality impact projected for the area as a result of the general commercial, residential, and other growth associated with the proposed project.

Class I Area - Visibility Analysis

Federal Class I areas are regions of special national or regional value from a natural, scenic, recreational, or historic perspective. Class I areas are afforded the highest degree of protection among the types of areas classified under the PSD regulations. U.S. EPA has established policies and procedures that generally restrict consideration of impacts of a PSD source on Class I Increments to facilities that are located near a federal Class I area. Historically, a distance of 100 km has been used to define "near", but more recently, a distance of 300 kilometers has been used for all facilities that do not combust coal.

While there are no Class I areas within 100 km of the proposed project in Fulton and Clayton Counties, Georgia, there are five Class I areas located within 300 km of the proposed project. Four of the Class I areas within 300 km of the proposed facility, the Cohutta Wilderness, Joyce Kilmer, Shining Rock, and Sipsey Wilderness areas, are managed by the Forest Service (FS). The Great Smoky Mountains National Parks is managed by the National Park Service (NPS). The Class I areas within a 300 km radius of Delta, along with Q/D values, are listed in Table 7-1.

Table 7-1. Summary of Class I Areas within 300 km of the Proposed Project

Class I Area	Responsible FLM	Minimum Distance from Site (km)	Sum of Annualized VAP Emissions - Q (tpy)	FLAG 2010 Approach Q/D
Cohutta Wilderness	FS	134		4.5
Joyce Kilmer Slickrock Wilderness	FS	194		3.1
Great Smoky Mountains National Park	NPS	207	596	2.9
Shining Rock	FS	233		2.6
Sipsey Wilderness Area	FS	282		2.1

Delta submitted concurrent with this application, separate requests to the appropriate FLMs to obtain their agreement with the findings for the nearby Class I areas. Copies of the letters to the FLMs presenting the Q/D screening analysis are included in Appendix G of the application.

As seen above in Table 7-1, the Q/D is below 10 for all Class I areas; therefore, no further analysis is required to determine the impact on Air Quality Related Values (AQRV) on Class I areas.

Soils and Vegetation

Assessment of the impact on soils and vegetation in the surrounding area is limited to the impact from ozone resulting from the increased emissions of NOx as a precursor to ozone formation. All pollutant emission increases are below their respective Significant Emission Rates (SERs) as established in the PSD regulations. The area surrounding the facility is currently designated as non-attainment for ground-level ozone. Delta will be required to obtain offsetting NOx emission reduction credits in excess of the NOx emissions increase resulting from this project. Therefore, it is expected that the project will reduce the overall impact of ozone on the surrounding soils and vegetation.

Growth

Growth impacts are intended to assess the additional residential, commercial, and industrial development that is likely to occur as a result of the project. In this case, the addition of Test Cell No. 5 at Delta - Technical Operations Center, the infrastructure already exists to support the many operations, including existing test cells, currently at Tech Ops. Test Cell No. 5 is being proposed for construction in order to accommodate the new aircraft fleet engines of the future, not necessarily to accommodate the testing of more total aircraft engines. So, as older aircraft engines are retired and/or phased out, more new model aircraft will enter the fleet and require testing within Test Cell No. 5 building rather than in the existing test cells. Additional staff, if any, will come from the existing community and no additional commercial or industrial services are expected to result from the project.

Minor impacts due to construction of Test Cell No. 5 are expected to the surrounding area as the building will be located within the existing Delta - Technical Operations Center property boundary. The construction site for the Test Cell No. 5 building is located on an existing parking lot so minimal earth moving and paving will be required. Additionally, Delta and the contractors working on the construction of Test Cell No. 5 will implement procedures and practices to mitigate potential emissions due to construction activities. Therefore, additional growth from the project is expected to be minimal, if any.

8.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed facility are included in draft Permit Amendment No. 4512-063-0105-V-03-2.

Section 1.0: Facility Description

Delta Air Lines, Inc. Technical Operations Center performs aircraft maintenance and repair operations. Specific activities conducted at the facility include, but are not limited to, surface coating, solvent cleaning, electroplating, depainting, engine testing, and facilities support activities including boilers, emergency power generators, and fire pumps.

The application is for the construction and operation of an additional test cell which will be Test Cell No. 5 (SHEA ID No. 5898) in addition to supporting equipment. Test Cell No. 5 will accommodate future aircraft engines for which the current test cells do not have the capability to house. The supporting equipment for Test Cell No. 5 will include two, 25,000-gallon jet-A fuel storage tanks (SHEA ID Nos. 5894 and 5895) and a fuel pump package designed to provide fuel to the jet engines during testing. The two jet-A fuel storage tanks associated with Test Cell No. 5 will be filled via a fuel line connected to the existing system which fills the storage tanks for the current jet engine test cells. Jet-A fuel will be transferred from the two jet-A storage tanks to Test Cell No. 5 via the fuel pump package. There will be two, 200-gallon oil storage tanks installed as part of the project, one for lubrication (SHEA ID No. 5938) and one for preservation oil (SHEA ID No. 5936) which will provide oil to the jet engines being tested within Test Cell No. 5. In addition, Delta is proposing the installation of one 2,000-gallon used oil storage tank (SHEA ID No. 5893) that will collect used lubrication oil from the jet engines through a line connecting to the pre-test bay of the Test Cell No. 5 building. Delta also plans to install one 200-gallon diesel storage tank and fuel pump station (SHEA ID No. 5890) to provide fuel to the vehicles used to transport jet engines in and around the Test Cell No. 5 building. A 40-gallon pneumatic pressure pot with spray gun (SHEA ID No. 5901) will also be used to perform engine flush cleaning operations for Test Cell No. 5.

Section 2.0: Requirements Pertaining to the Entire Facility

No conditions in Section 2.0 are being added, deleted or modified as part of this permit action.

Section 3.0: Requirements for Emission Units

Condition 3.1.1 adds NSR 14 to the NSR Avoidance Groups. Engine Test Cell No. 5 will have the same rules and regulations as Emission Group ET01 and will be part of this emission group. The rules and regulations for Emission Group ET01 are already included in Permit No. 4512-063-0105-V-03-0.

Condition 3.2.11 is a new condition which limits the NOx emissions from NSR Avoidance Group NSR 41 (Engine Test Cell No. 5) to less than 39.5 tpy for PSD avoidance.

Condition 3.2.12 is a new condition which limits the hours of performance testing for Test Cell No. 5 to 3,000 hours per year for work practice standards.

Condition 3.2.13 is a new condition which limits the fuel used in Test Cell No. 5 will be limited to 0.3 percent sulfur by weight for work practice standards.

Condition 3.3.46 is a new condition which requires Delta to purchase at least 52 tons of NOx emission reduction credits prior to the startup of Engine Test Cell No. 5 as NAA-NSR requirement.

Section 4.0: Requirements for Testing

No conditions in Section 4.0 are being added, deleted or modified as part of this permit action.

Section 5.0: Requirements for Monitoring

No conditions in Section 5.0 are being added, deleted or modified as part of this permit action.

Section 6.0: Other Recordkeeping and Reporting Requirements

Condition 6.1.7.1b.xvi. is a new condition which requires exceedance(s) of the limit for NSR Avoidance Group NSR14 to be reported.

Condition 6.1.7.1b.xvii. is a new condition which requires exceedance(s) of the limit for hours of performance testing to be reported.

Condition 6.1.7.1b.xviii. is a new condition which requires exceedance(s) of the limit of sulfur content for fuel used in Engine Test Cell No. 5 to be reported.

Condition 6.2.51 is a new condition which requires records for number and types of engines tested, fuel consumed for each test, test data from each engine test, NOx emissions for each test, emission factor records and hours of engines tested for NSR Avoidance Group NSR 41 (Engine Test Cell No. 5).

Condition 6.2.52 is a new condition which requires monthly NOx emission calculations for NSR Avoidance Group NSR 41 (Engine Test Cell No. 5).

Condition 6.2.53 is a new condition which requires the calculations of 12-month rolling NOx emission totals. Delta is required to submit a notification if any 12-month total exceeds 35.5 tons which is 90% of the NSR emission limit.

Condition 6.2.54 is a new condition which requires the calculations of 12-month rolling totals of hours engines tested. Delta is required to submit a notification if any 12-month total exceeds 2,700 hours which is 90% of the limit for the work practice standard.

Condition 6.2.55 is a new condition which requires verification of the fuel sulfur content for the work practice standard. Delta is required to submit a notification if any fuel exceeds 0.3 percent sulfur by weight.

Section 7.0: Other Specific Requirements

No conditions in Section 7.0 are being added, deleted or modified as part of this permit action

Attachments

Attachment B was updated to include the supporting equipment for Engine Test Cell No. 5. Storage tanks SHEA ID Nos. 5890, 5893, 5936, and 5938 were added to Insignificant Activities Checklist - *All petroleum liquid storage tanks with a capacity of less than 10,000 gallons storing a petroleum liquid*. Storage tanks SHEA ID Nos. 5894 and 5895 were added to Insignificant Activities Checklist - *All petroleum liquid storage tanks storing a liquid with a true vapor pressure of equal to or less than 0.50 psia as stored*.

Attachment D was updated to include the propose equipment into the appropriate regulatory group and to add NSR Avoidance Group NSR14. The proposed Flush Cleaning Operations (SHEA ID No. 5901) was added to Regulatory Group – Equipment Group FC01.

APPENDIX A

Draft Revised Title V Operating Permit Amendment
Delta Air Lines Inc. - Technical Operations Center
Atlanta (Fulton and Clayton Counties), Georgia

APPENDIX B

Delta Air Lines Inc. - Technical Operations Center
NAA-NSR Permit Application and Supporting Data

Contents Include:

1. NAA-NSR Permit Application No. 44147, dated February 21, 2017